All of the pending claims stand rejected. Applicants respectfully request reconsideration of the rejection of the claims based on the following comments.

Rejections Over Jaskie

The Examiner rejected claims 1, 4-6, 20-25 and 27-30 under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent 5,442,254 to Jaskie (the Jaskie patent). As noted by the Examiner the Jaskie patent discloses the desirability of having highly uniform fluorescent particles. Applicant submitted a Declaration by Professor Singh with a Preliminary Amendment dated March 24, 2000 in support of arguments that the Jaskie patent did not enable the production of Applicants' claimed invention. The Examiner did not find the Singh reference convincing. Below, Applicants present arguments for patentability including a Declaration by Professor Bricker, assertions regarding the persuasiveness of Dr. Singh's Declaration, and additional objective evidence regarding patentability over the Jaskie reference.

The proposition is well established that the prior art only renders a composition of matter unpatentable to the extent that the prior art provides a means of obtaining the composition.

> To the extent that anyone may draw an inference from the Von Bramer case that the mere printed conception or the mere printed contemplation which constitutes the designation of a 'compound' is sufficient to show that such a compound is old, regardless of whether the compound is involved in a 35 U.S.C. 102 or 35 U.S.C. 103 rejection, we totally disagree. ... We think, rather, that the true test of any prior art relied upon to show or suggest that a chemical compound is old, is whether the prior art is such as to place the disclosed 'compound' in the possession of the public.

In re Brown, 141 USPQ 245, 248-49 (CCPA 1964)(emphasis in original)(citations omitted). Similarly, see In re Hoeksema, 158 USPQ 596, 600 (CCPA 1968)(emphasis in original):

> We are certain, however, that the invention as a whole is the claimed compound and a way to produce it, wherefore appellant's argument has substance. There has been no showing by the Patent Office in this record that the claimed compound

> can exist because there is no showing of a known or obvious way to manufacture it; hence, it seems to us that the 'invention as a whole,' which section 103 demands that we consider, is not obvious from the prior art of record.
>
> While there are valid reasons based on public policy as to why this defect in the prior art precludes a finding of obviousness under section 103, In re Brown, supra, its immediate significance in the present inquiry is that it poses yet another difference between the claimed invention and the prior art which must be considered in the context of section 103. So considered, we think the differences between appellant's invention as a whole and the prior art are such that the claimed invention would not be obvious within the contemplation of 35 U.S.C. 103.

The Federal Circuit has further emphasized these issues. "But to be prior art under section 102(b), a reference must be enabling. That is, it must put the claimed invention in the hands of one skilled in the art." In re Sun, 31 USPQ2d 1451, 1453 (Fed. Cir. 1993)(unpublished). Assertions in a prior art reference do not support an anticipation or obviousness rejection unless the references place the claimed invention in the hands of the public. Beckman Instruments Inc. v. LKB Produkter AB, 13 USPQ2d 1301, 1304 (Fed. Cir. 1989). "In order to render a claimed apparatus or method obvious, the prior art must enable one skilled in the art to make and use the apparatus or method." Id. While a reference is prior art for all that it teaches, references along with the knowledge of a person of ordinary skill in the art must be enabling to place the invention in the hands of the public. In re Paulsen, 31 USPQ2d 1671, 1675 (Fed. Cir. 1994). See also In re Donohue, 226 USPQ 619, 621 (Fed. Cir. 1985).

In evaluating obviousness, the level of skill in the art must be considered. MPEP §2141, citing Graham v. John Deere, 383 U.S. 1, 148 USPQ 459 (1966). In the present case, a person of ordinary skill in the art would have, at least, a bachelors degree in electrical engineering, material science or physics, and with experience in particle technology and/or the fluorescent properties of material. As will be discussed in detail below, the technology discussed in the prior art reference for particle separation is

unconventional in the technology area. Therefore, we can look to persons of skill in the separation technology to evaluate the disclosure of wet filtration in the Jaskie patent. However, a person of ordinary skill in the art of fluorescent nanoparticles would be a person with skill in inorganic material science, electrical engineering or physics and would have limited understanding of chromatographic separation technology. Therefore, Applicants believe that Professor Bricker would have significant extraordinary skill in separation technology relative to a person or ordinary skill in the **relevant** technology.

Under a factual inquiry relating to an obviousness analysis, objective evidence **must** be considered. See, MPEP §2141, and Graham v. John Deere, 383 U.S. 1, 148 USPQ 459 (1966). "[T]he conclusion of obviousness vel non is based on the preponderance of evidence and argument in the record." In re Oetiker, 24 USPQ2d 1443, 1445 (Fed. Cir. 1992). The patent office has the ultimate burden of persuasion in establishing that an applicant is not entitled to a patent. Id. at 1447, concurring opinion of Judge Plager.

Declaration by Professor Bricker

A Declaration by Professor Bricker is enclosed with this amendment. Professor Bricker is an expert in separation technologies similar to the "wet filtration" approaches described in the Jaskie patent at column 7, lines 28-40. Dr. Bricker's Declaration presents an explicit explanation of why the process described in the Jaskie patent cannot and will not work for the intended purpose. Thus, **Applicants have presented clear objective evidence that the Jaskie patent does not enable the production of Applicants' claimed invention.**

Persuasiveness of Professor Singh's Declaration

Applicants filed an Declaration under 37 C.F.R. §1.132 by Professor Singh. In response to Dr. Singh's Declaration submitted by Applicants, the Examiner has indicated that the Declaration had no probative value. The Examiner cited for support MPEP 716.01(c).

Applicants respectfully assert that the Examiner incorrectly cited the MPEP and the underlying case law.

In the Office Action, the Examiner stated that "To be of probative value, any objective evidence should be supported by actual proof." However, MPEP 716.01(c) states "[opinion] testimony is entitled to consideration and some weight so long as the opinion is not on the ultimate legal conclusion." "In assessing the probative value of an expert opinion, the examiner **must** consider the nature of the matter sought to be established, the strength of any opposing evidence, the interest of the expert in the outcome of the case, and the presence and absence of factual support for the expert's opinion." Id. [Emphasis added].

Professor Singh has no interest to be gained in the present case. Dr. Singh is an expert who has consulted with many important companies in the field of nanotechnology. As noted in the Declaration, Dr. Singh has no equity interest in NanoGram. Any expert will require payment for their time. He is not an inventor and has not consulted for NanoGram in the area of phosphors, except for the Declaration under discussion. Dr. Singh has **no interest** in the outcome of the present patent application.

The Examiner indicated that Dr. Singh's Declaration was self-contradictory because of statements relating to reasons why chromatographic techniques have not been explored for the separation of inorganic nanoparticles. Applicants firmly believe that Dr. Singh's Declaration is not self-contradictory. Dr. Singh was addressing a speculative proposition, the separation of nanoparticles by size using chromatography. To state that the procedure would be difficult or impossible to scale up is one explanation of why no work has been reported on the approach or related approaches to date. Since no work had been done previously, an undue amount of experimentation would be required to attempt to practice the technique. This argumentation is **completely self-consistent**.

Applicants do not deny that generally chromatography is a well developed field for **chemical and biochemical separation**. However, this experience does not extend into the separation of solid inorganic particles. The Examiner cited isotope separation of lithium in 1938. However, the Examiner did not provide a copy of the Instruments of Science and Historical Encyclopedia, page 108 with the Office Action. This reference is not readily available to Applicants. Regardless, the separation of lithium isotopes was likely performed with **gas chromatography**, which involves small molecules vaporized in a gas stream. **The chromatography used to separate the lithium isotopes could not have been performed by particle size separation since isotopes (differing only in the number of neutrons) do not have different sizes, but only different masses.** Applicants respectfully request that the Examiner check the reference for the type of separation being performed and forward a copy to Applicants if he maintains his position regarding the reference teaching the separation of solid particles. Therefore, Applicants do not believe that there is any evidence whatsoever contrary to their position and the expert opinion of Professor Singh that an undue amount of experimentation would be required to attempt to separate nanoparticles by size using wet filtration described in the Jaskie patent.

In the present case, the nature of the matter sought to be established is at best speculative. It is difficult to establish that a method that has never been tried is not a useful approach. To establish a new method of purifying nanoparticles based on the minimal guidance from the Jaskie patent is at most an invitation to perform extensive research in the hopes that it may work. Professor Singh's Declaration addressed the relevant issues from the perspective of an **expert** in the field of inorganic particles regarding the suggestions in the Jaskie patent.

Nevertheless, to confirm that Dr. Singh's statements were well founded, Applicants have identified and obtained a Declaration from

an expert in chromatography, Dr. Bricker, who has directly addressed the disclosure in the Jaskie patent. Professor Bricker concluded that the Jaskie "wet filtration" will not work to separate nanoparticles. Dr. Bricker's expert Declaration has presented the objected evidence to directly address the issues raised in the Jaskie patent. The conclusions that follow from Dr. Bricker's analysis are consistent with and support Dr. Singh's statements. In addition, Applicants present below additional objective evidence that the best conventional filtering approaches available for nanoparticles are not sufficient to perform the necessary particle separation to practice Applicants' claimed invention.

In summary, there is no evidence contrary to Dr. Singh's statements regarding the disclosure in the Jaskie patent. The Jaskie patent does not present any experimental results. Almost five years after the Jaskie patent issued, there is no public knowledge of successful application of the Jaskie approach. This failure regarding the practice of the Jaskie invention is objective evidence against the Jaskie suggestion. Applicants have further supported the opinions in Dr. Singh's Declaration by a Declaration by Dr. Bricker, an expert in separation technologies, and by objective evidence regarding the lack of availability of commercial approaches suitable to performed the specified particle separations.

Thus, the statements made by Professor Singh have now been confirmed by an expert in separation technology, Professor Bricker. Together, the Declarations by Professor Singh and Professor Bricker have provided overwhelming objective evidence from a person with considerable experience in the separation of biological nanoparticles as well as the perspective of an expert in inorganic nanoparticle technology that the approach discussed in the Jaskie patent will not work produce the compositions disclosed and claimed by Applicants.

Patentability Over the Jaskie Patent

Applicants have presented objective evidence in the form of Declarations of Dr. Bricker, an expert in separation technology, and Dr. Singh, an expert in inorganic nanoparticle technology, that the "wet filtration" approaches disclosed in the Jaskie patent at column 7, lines 28-40 will not work to obtain particles with a selected narrow particle size. As further evidence, Applicants present objective data in the form of product information from a supplier of **state of the art** inorganic particle filtration technology.

In particular, Applicants have enclosed information downloaded from the Millipore Corporation web site. Millipore is a leader in filtration technology. Uniformity of particles is also a desirable feature for inorganic particles used in the fine polishing of electronic substrates, generally referred to chemical-mechanical polishing or CMP. This information from Millipore indicates that standard CMP slurries have a significant fraction of larger particles combined with the desired nanoscale particles. Included in the enclosed materials is a plot of the removal capability of Millipore's line of Planargard™ filters used to filter surface polishing slurries. These filters are not perfectly effective for removing particles even with diameters of greater than one micron. In addition, the filters are not effective for distinguishing a cut-off of particles less than a micron. Applicants' claims indicate that the average particle size is less than 100 nm. Thus, filtration is not an effective means of creating the narrow particle size distributions, as disclosed and claimed by Applicants.

In contrast with the Jaskie approach of wet filtration, Applicants' particle production approach forms a narrow distribution of particle sizes during the formation of the particles. Thus, no separation of the particles is needed. Since the Jaskie patent does not place the public in possession of

Applicants' claimed invention, the Jaskie patent does not render Applicants' claimed invention obvious. **Applicants believe that they have more than met their burden in overcoming prima facie obviousness.** Applicants respectfully request the withdrawal of the rejection of claims 1, 4-6, 20-25 and 27-30 under 35 U.S.C. §103(a) as being unpatentable over the Jaskie patent.

Rejections Over Jaskie and Bhargava

The Examiner rejected claims 2, 3 and 26 under 35 U.S.C. §103(a) as being unpatentable over the Jaskie patent in view of U.S. Patent 5,455,489 to Bhargava (the Bhargava patent). The Examiner cited the Bhargava patent for disclosing ZnO, ZnS and Y_2O_3 as phosphors. The Examiner further cited the Bhargava patent for disclosing the use of phosphors in an electroluminescent display. Applicants respectfully request reconsideration of the rejections based on the following comments.

As described in detail above, the Jaskie patent is deficient with respect to disclosing Applicants' claimed invention based on a narrow particle size distribution. The Bhargava patent does not teach or suggest the selection of particle size as a way of tuning the emission frequencies of phosphor particles. Furthermore, the Bhargava patent does not teach or suggest phosphor particles with a narrow size distribution as disclosed and claimed by Applicants. Thus, the Bhargava patent does not make up for the deficiencies of the Jaskie patent.

Since the Jaskie patent and the Bhargava patent do not teach appropriate approaches to produce phosphor particles with the narrow particle size distribution disclosed and claimed by Applicants, the combined disclosures of the two patents do not render Applicants' claimed invention obvious. Applicants respectfully request the withdrawal of the rejection of claims 2, 3 and 26 under 35 U.S.C. §103(a) as being unpatentable over the Jaskie patent in view of the Bhargava patent.

CONCLUSIONS

In view of the above amendments and remarks, Applicants submit that this application is in condition for allowance, and such action is respectfully requested. The Examiner is invited to telephone the undersigned attorney to discuss any questions or comments that the Examiner may have.

The Director of the Patent and Trademark Office is authorized to charge any fee deficiency required by this paper or credit any overpayment to Deposit Account No. 23-1123.

Respectfully submitted,

WESTMAN, CHAMPLIN & KELLY, P.A.

By: Peter S. Dardi

Peter S. Dardi, Ph.D., Reg. No. 39,650
Suite 1600 - International Centre
900 Second Avenue South
Minneapolis, Minnesota 55402-3319
Phone: (612) 334-3222 Fax: (612) 339-3312

PSD:nhw